National Institute of Environmental Health Sciences

Modelling the effects of weather and climate on malaria distributions in West Africa

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Abstract:

Background: Malaria is a leading cause of mortality worldwide. There is currently conflicting data and interpretation on how variability in climate factors affects the incidence of malaria. This study presents a hierarchical Bayesian modelling framework for the analysis of malaria versus climate factors in West Africa. Methods. The hierarchical Bayesian framework takes into account spatiotemporal dependencies, and in this paper is applied to annual malaria and climate data from ten West African countries (Benin, Burkina Faso, Côte d'Ivoire, Gambia, Ghana, Liberia, Mali, Senegal, Sierra Leone, and Togo) during the period 1996-2006. Results: Results show a statistically significant correspondence between malaria rates and the climate variables considered. The two most important climate factors are found to be average annual temperature and total annual precipitation, and they show negative association with malaria incidence. Conclusions: This modelling framework provides a useful approach for studying the impact of climate variability on the spread of malaria and may help to resolve some conflicting interpretations in the literature.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Meteorological Factors, Meteorological Factors, Precipitation, Temperature

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Africa

African Region/Country: African Region

Other African Region: west africa

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Mosquito-borne Disease

Mosquito-borne Disease: Malaria

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified